

Bedienungsanleitung  
Operating instructions  
Mode d'emploi  
Istruzioni per l'uso  
Gebruiksaanwijzing  
Bruksanvisning  
Betjeningsvejledning  
Käyttöohje  
Instrucciones de manejo

PS 3000

**High Fidelity** DIN 45500

## Deutsch

Seite 1

Bitte klappen Sie beim Lesen der Bedienungsanleitung die Seite 42 aus

## English

Page 5

Keep page 42 open when reading the Operating Instructions

## Français

Page 9

Déplier la page 42 en lisant le mode d'emploi

## Italiano

Pag. 13

Durante la lettura delle istruzioni per l'uso aprite la pagina 42

## Nederlands

Pag. 17

Sla bij het lezen van de gebruiksaanwijzing pagina 42 uit

## Svenska

Sida 21

Vik ut sida 42 när Ni läser bruksanvisningen

## Norsk

Side 25

Hold side 42 åpne når bruksanvisningen leses

## Dansk

Side 29

Hold side 42 opslået, mens De læser brugsanvisningen

## Suomi

Sivu 33

Pida sivu 42 auki tutustuessasi käyttöohjeeseen

## Español

Pág. 37

Mantenga abierta la página 42 cuando lea las instrucciones de manejo

# English

## This HiFi record player . . .

. . . is equipped with 'DIRECT CONTROL', a completely new type of drive system combining the advantages of both belt and direct drive systems and ensuring absolutely constant turntable speed with negligible wow and flutter.

The prime mover is a d.c. motor which drives the turntable/tachometer assembly via a precision ground belt. The tachometer continuously monitors the turntable speed, which it feeds to an electronic circuit. This compares the signal from the tachometer to an extremely stable reference signal.

Should any difference be found, a control signal is immediately triggered, the action of which is to adjust the power supply to the motor so that the correct turntable speed is instantly obtained. Mains voltage or temperature fluctuations and varying frictional forces arising from, say, the use of a cleaning arm thus have minimal effect on the turntable speed.

Other features of this record player in addition to its unique drive system are:

- Extremely low rumble, thanks to the independent suspension of the turntable and pick-up arm.
- Automatic and manual operation. Use whichever you prefer in playing your records. In automatic operation a sensor in the turntable determines the set down position of the pick-up arm.
- Precise adjustment of turntable speed is made possible with the aid of fine-adjustment controls and an electronic speed indicator.
- Adjustable stylus force and side-thrust compensation.
- Viscosity damped pick-up arm lift.

## Controls etc.

Fig. 1

- ① mains plug (not fitted to all versions)
- ② driving disc/tachometer assembly
- ③ connecting cable
- ④ counterweight
- ⑤ knob for adjustment of side-thrust compensation
- ⑥ speed indicator
- ⑦ fine-speed control for 45 rpm
- ⑧ fine-speed control for 33 rpm
- ⑨ stylus force indicator
- ⑩ pick-up arm cue lever
- ⑪ 45-rpm key
- ⑫ 33-rpm key
- ⑬ stop key

- ⑭ start key
- ⑮ pick-up headshell
- ⑯ coupling ring for headshell attachment
- ⑰ pick-up arm lock
- Ⓐ transportation screw
- Ⓑ transportation locking swivels
- Ⓒ transportation clamp

Fig. 2

- ⑱ screw for adjustment of lift height

Fig. 3

- ⑲ screw for adjustment of arm set down position

Fig. 4

- ⑳ screws for adjustment of cover hinges

## Installation

### Mains voltage

Check that the mains voltage to which the apparatus has been set, which is indicated on the type plate on the base, is the same as that of your mains supply. If it is not, ask your dealer or service organization to alter the setting.

### Transport safeguards

The sub-chassis (the independently suspended unit consisting of the turntable and the pick-up arm) is locked in position by the screws Ⓐ and the swivels Ⓑ to protect it against shocks during transportation. The bracket of the diameter sensing system is locked with clamp Ⓒ. Also some parts of the apparatus may have cardboard and/or plastic protective material.

Before fitting the turntable, release the sub-chassis by removing the screws Ⓐ and turning the locking swivels Ⓑ (anti-clockwise) free of the top plate. To release the diameter sensing system, remove clamp Ⓒ by pressing in the direction indicated. Any protective material must also be removed.

*Whenever the record player is to be transported, first lock the sub-chassis in position by turning the swivels Ⓑ clockwise to their limit.*

### Assembly

The turntable, the counterweight and the adapter for 45-rpm records are packed separately.

Place the turntable in position over the spindle of the driving disc/tachometer assembly ②.

Screw counterweight ④, as shown in Fig. 1, onto the end of the pick-up arm as far as it will go.

### Adjustment of the stylus force and the side-thrust compensation

Stylus force is the vertical force which is exerted

downwards by the stylus on the record. Each type of cartridge has its own optimum stylus force, the value in each case being shown in the technical data supplied with the cartridge. It is of the utmost importance that the stylus force should be precisely adjusted as recommended, since a force which is too high or too low can impair the sound quality and damage your records. Stylus force is expressed in grams force (gf; 1 gf = 10 mN). It is adjusted by means of counterweight ④ and can be read directly from stylus force indicator ⑨.

Side thrust is the force which, generated by the friction of the stylus in contact with the walls of the groove, tends to press the stylus more strongly against the inner wall and thus gives rise to sound distortion. The side thrust depends on the stylus force and the shape of the stylus. This record player incorporates a system for side-thrust compensation, the level of which is adjusted by means of knob ⑤. This has two scales. The black scale, with a small white triangle as reference point, is for pick-up cartridges with a spherical stylus (e.g. Philips SUPER M II cartridge GP 400 II). The orange scale, with a small orange triangle as reference point, is for cartridges with either a bi-radial stylus (e.g. Philips SUPER M II cartridge GP 401 II or GP 412 II) or a CD4 stylus (e.g. Philips SUPER M II cartridge GP 422 II). The side-thrust compensation must be set to correspond to the same value as the stylus force.

Adjust the stylus force and the side-thrust compensation as follows:

- Check that knob ⑤ is at '0'.
- Place cue lever ⑩ to 'V'.
- Release the pick-up arm by pressing lock ⑰ to the right.
- With one hand, support the pick-up arm above the arm rest. With the other hand, unscrew counterweight ④ until the green line of stylus force indicator ⑨ denotes the desired stylus force when the pick-up arm is laid on the rest. For cartridge GP 400 II, with which most versions of this record player are provided, the reading should be '2'.
- Turn knob ⑤ until the desired value on the scale concerned is opposite the corresponding small triangle. For cartridge GP 400 II the reading should be '2' on the black scale.

#### Connection

- Insert mains plug ① in the room socket.

#### Important note (U.K. only)

When fitting a mains plug to the mains lead, please proceed as follows:

The wires in the mains lead are coloured in accordance with the following code:

Blue - Neutral      Brown - Live

As these colours may not correspond with the colour markings identifying the terminals in your plug proceed as follows:

The Brown wire must be connected to the terminal which is marked with the letter L or coloured Red. The Blue wire must be connected to the terminal which is marked with the letter N or coloured Black.

*Note:* This apparatus must be protected by a 3 amp Fuse if a 13 amp plug is used, or if any other type of plug is used by a 5 amp Fuse either in the plug or adapter, or at the distribution board. If in doubt consult a qualified electrician.

- Connect cable ③ to the input on your amplifier for magnetodynamic pick-up cartridges.

#### Switching on and off

This record player has no separate mains switch. It is switched on by pressing start key ⑭. Speed indicator ⑥ lights when this is done.

The apparatus is switched off automatically at the end of the record or manually by pressing stop key ⑬. The speed indicator then goes out.

*As the record player does not have a mains switch, the mains plug should be withdrawn from the room socket when the apparatus is left unused for holidays or similar long periods.*

#### Checking and adjusting the turntable speed

Immediately the turntable reaches the correct speed, the central LED (Light-Emitting Diode) of speed indicator ⑥ lights brightly.

If the left-hand LED lights (with or without the central one) the speed is too low. If the right-hand LED lights (with or without the central one) the speed is too high. To set the correct speed, turn fine-speed control ⑦ (for 45 rpm) or ⑧ (for 33 rpm) clockwise if the speed is too low, or anti-clockwise if it is too high, until the central LED lights brightly. The possibility of adjusting the speed may also be useful if you wish to play a musical instrument together with a record. You may need to adjust the pitch of the music on the record to that of your own instrument. By altering the turntable speed with the appropriate fine-speed control, you can alter the pitch by up to a semitone.

## Operation

- Carefully swing up the stylus guard.
- Free the pick-up arm by pressing lock ⑰ to the right.
- Select the speed desired by pressing either key ⑪ (45 rpm) or ⑫ (33 rpm).

### *Use as an automatic player*

(for 33-rpm records of 30-cm (12") diameter and 33- and 45-rpm records of 17-cm (7") diameter)

- Ensure that cue lever ⑩ is at '▼'.
- Start the turntable by pressing start key ⑭. The pick-up arm is raised from the rest and descends on to the record. The sensor in the turntable determines the set down position of the pick-up arm.

### *Use as a non-automatic player*

(for all 33-rpm and 45-rpm records)

- Place cue lever ⑩ to '▼'.
- Start the turntable by lifting the pick-up arm from the rest and bringing it into position above the desired part of the record.
- Place cue lever ⑩ to '▼'. The pick-up arm now descends on to the record.

At the end of the record the pick-up arm returns to the rest. When you have finished playing records, lock the pick-up arm in place by pressing lock ⑰ to the left.

### *Interruption of play*

Place cue lever ⑩ to '▼'. The pick-up arm rises from the record and the turntable continues to rotate. To resume playing, return the cue lever to '▼'.

### *Stopping during play*

Press stop key ⑬. The arm returns to the rest. You can also stop by placing cue lever ⑩ to '▼' and laying the pick-up arm by hand on the rest.

## Maintenance

### *General*

As the mechanism of the record player has self-lubricating bearings, it requires no maintenance. Although the diamond stylus of a SUPER M II cartridge wears very slowly, it is advisable to have it checked at regular intervals, e.g. twice a year. In this way it can be replaced if necessary in good time. Dust and hairs can be removed from the stylus with a small, soft-haired brush, which should be stroked over the stylus in a direction moving from rear to front of the cartridge. More obstinate deposits can be removed if the brush is moistened with a little cleaning spirit.

### *Adjusting the lift height*

If with the apparatus on automatic operation the pick-up arm does not rise sufficiently from the rest, the lift height - the height to which the arm is raised - can be increased.

- Swing up the stylus guard.
- Place cue lever ⑩ to '▼'.
- Place the pick-up arm over a 30-cm record.
- Turn adjustment screw ⑱ (Fig. 2) anti-clockwise until the required lift height is obtained. Do not turn the screw too far, however, for, with the stylus on the record, a clearance of about 0.5 mm ( $\frac{1}{50}$ " ) must remain between the top of the screw and the pick-up arm.

The lift height can be reduced, if desired, by turning the screw clockwise. Here as well, the screw must not be returned too far, since, with the cue lever at '▼', the stylus must be not less than 6 mm ( $\frac{7}{32}$ " ) above the record if the pick-up arm is to return correctly to the rest.

### *Adjusting the set down position*

With the apparatus on automatic operation, the stylus should lower into the run-in groove of the record. If it does not, adjust the position as required with adjusting screw ⑲ (Fig. 3).

If the screw is turned anti-clockwise, the stylus lowers nearer the edge of the record. If the screw is turned clockwise, the stylus lowers farther from the edge of the record. The pick-up arm must be on the rest when the adjusting screw is turned.

### *Adjusting the cover hinges (for record players with cover only)*

As the cover is fitted with friction hinges, it can remain open in practically any position. If the effect of the friction decreases, adjust the hinges by tightening the screws ⑳ (Fig. 4) a little.

*The hinges must not be lubricated.*

### *Cartridge*

Headshell ⑮ is attached to the pick-up arm by coupling ring ⑯. In order to check or replace the stylus or the cartridge, unscrew the ring and withdraw the headshell carefully from the arm. To secure the headshell to the arm, press it gently into the arm and turn the coupling ring. The headshell is automatically aligned by its guide pins and notches.

### *Replacing the stylus*

The stylus of a SUPER M II cartridge is mounted in a stylus carrier, which is slid into the cartridge body. When the stylus is worn out, therefore, you need to replace only the stylus carrier and not the whole cartridge.

In replacing, hold the headshell upside down in one hand and, with the thumb and index finger of the other hand, withdraw the stylus carrier carefully and in a straight line from the cartridge (Fig. 5, a). Then slide the new carrier into the cartridge, again moving in a straight line (Fig. 5, b).

*Buy only stylus carriers bearing the name PHILIPS on the stylus guard and packaging. Only in this way can the quality of the original cartridge be maintained.*

#### *Replacing the cartridge*

Only SUPER M II cartridges can be attached to headshell ⑮. The position of the cartridge on the headshell is accurately determined by the area outlined on the inner side of the headshell.

Loosen the screws securing the old cartridge and carefully pull the coloured wires from the cartridge's contact pins.

First connect the coloured wires to the pins of the new cartridge as follows:

L (white) to L (left-hand channel)  
R (red) to R (right-hand channel)  
LG (blue) to LG (return left-hand channel)  
RG (green) to RG (return right-hand channel)

Now place the cartridge in the area marked and insert the screws through the holes in the top of the headshell and the slots on both sides of the cartridge (Fig. 6). Finally, tighten the screws uniformly but not excessively.

If you wish to use a cartridge other than the SUPER M II, a different headshell is required. This can be purchased separately under code number 4822 402 60627 and is suitable for all cartridges having RETMA fixing standard ( $\frac{1}{2}$ " - 12.7 mm). It is supplied with a jig for aligning the cartridge and with mounting hardware.

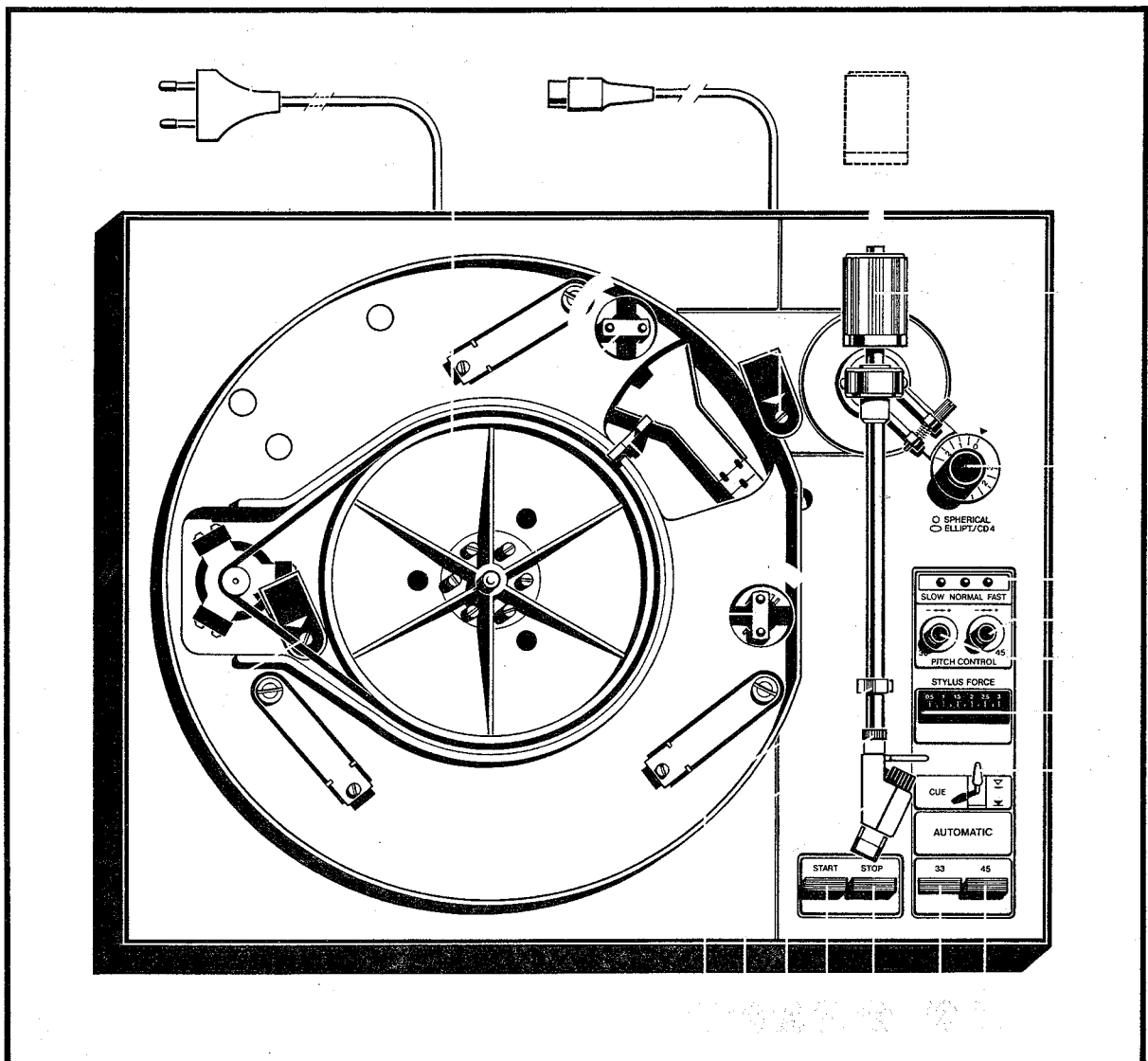
Now also first connect the coloured wires to the cartridge as described above. Then attach the cartridge loosely to the headshell using the appropriate screws and nuts. Lay the headshell in the jig (Fig. 7), turn it over and first of all check that the clearance between the tip of the stylus and the jig is approximately 1 mm ( $\frac{1}{25}$ "). If the clearance is greater than this, place one or more spacers under the cartridge. Now adjust the position of the cartridge carefully until the stylus is exactly in the centre of the notch in the jig and the long sides of the cartridge are parallel with the lines on the jig. Finish by tightening the screws uniformly.

#### **Technical data**

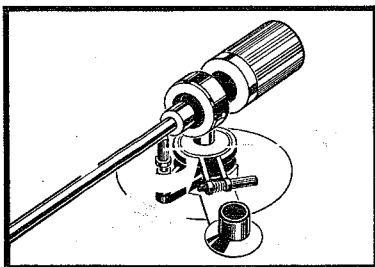
*(subject to alteration)*

|                                  |                                   |
|----------------------------------|-----------------------------------|
| Turntable speeds                 | 33 $\frac{1}{3}$ and 45 rpm       |
| Turntable speed adjustment range | $\pm 3\%$ (equal to one semitone) |
| Wow and flutter                  |                                   |
| DIN                              | less than 0.08%                   |
| WRMS                             | less than 0.05%                   |
| Rumble                           |                                   |
| DIN A                            | lower than -43 dB                 |
| DIN B                            | lower than -65 dB                 |
| Tracking error                   | smaller than 0°9' /cm             |
| Stylus force                     | adjustable from 1 to 3 gf         |
| Arm friction                     |                                   |
| horizontal                       | less than 15 mgf                  |
| vertical                         | less than 10 mgf                  |
| Mains voltage and frequency      | see type plate                    |
| Power consumption                | max. 3.5 W                        |
| Dimensions                       |                                   |
| with cover closed                | 420 × 144 × 348 mm                |
| with cover fully opened          | 420 × 405 × 420 mm                |
| Weight                           | approx. 5 kg                      |

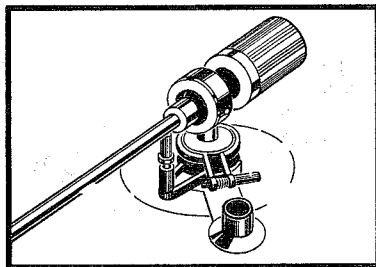
*The type plate will be found on the base of the apparatus*



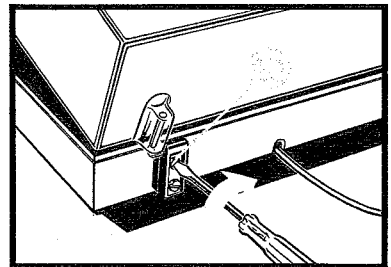
1



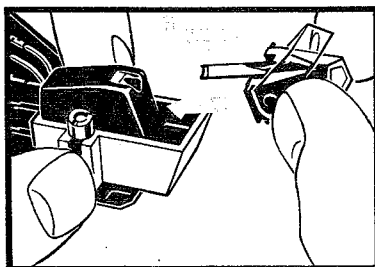
2



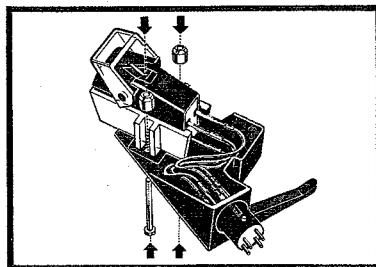
3



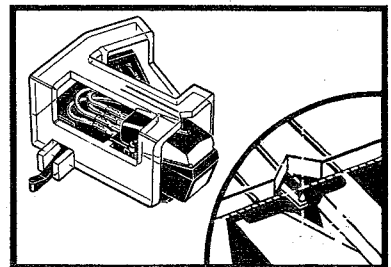
4



5



6



7

**SUPER M II GP 400 II - GP 401 II - GP 412 II**

|  | <b>GP 400 II</b>            | <b>GP 401 II</b>                   | <b>GP 412 II</b>                   |
|--|-----------------------------|------------------------------------|------------------------------------|
| Übertragungsbereich                        | 20-20.000 Hz $\pm 2$ dB     | 20-20.000 Hz $\pm 2$ dB            | 20-2.000 Hz $\pm 2$ dB             |
| Übertragungsfaktor (1 kHz)                 | 1,3 mV/cm/sec               | 1,3 mV/cm/sec                      | 1,5 mV/cm/sec                      |
| Unterschied des Übertragungsmaßes (1 kHz)  | <2 dB                       | <2 dB                              | <1 dB                              |
| Übersprechdämpfung (1 kHz)                 | >29 dB                      | >29 dB                             | >30 dB                             |
| FIM-Verzerrungen                           | <0,9% (2 p - 20 mN)         | <0,8% (1,7 p - 17 mN)              | <0,7% (1,2 p - 12 mN)              |
| Nadel (Diamant)                            | 15 $\mu$ m (sphärisch)      | 7 $\times$ 18 $\mu$ m (elliptisch) | 7 $\times$ 18 $\mu$ m (elliptisch) |
| Nadelmasse                                 | 0,2 mg                      | 0,2 mg                             | 0,1 mg                             |
| Nadelaufagekraft                           | 1,5 ... 3 p (15 ... 30 mN)  | 1,5 ... 2,5 p (15 ... 25 mN)       | 0,75 ... 1,5 p (7,5 ... 15 mN)     |
| Empfohlene Nadelaufagekraft                | 2 p (20 mN)                 | 1,7 p (17 mN)                      | 1,2 p (12 mN)                      |
| Nadelnachgiebigkeit (dynamisch horizontal) | >20 mm/N                    | >20 mm/N                           | >30 mm/N                           |
| Abtastfähigkeit                            | >90 $\mu$ m (2 p - 20 mN)   | > 90 $\mu$ m (1,7 p - 17 mN)       | >80 $\mu$ m (1,2 p - 12 mN)        |
| Nadelträgerereinheit Nr. (Ersatz)          | 4822 251 30048              | 4822 251 30049                     | 4822 251 30051                     |
| Frequency response                         | 20-20.000 Hz $\pm 2$ dB     | 20-20.000 Hz $\pm 2$ dB            | 20-25.000 Hz $\pm 2$ dB            |
| Sensitivity (1 kHz)                        | 1,3 mV/cm/sec               | 1,3 mV/cm/sec                      | 1,5 mV/cm/sec                      |
| Output asymmetry (1 kHz)                   | <2 dB                       | <2 dB                              | <1 dB                              |
| Channel separation (1 kHz)                 | >29 dB                      | >29 dB                             | >30 dB                             |
| Frequency intermodulation distortion       | <0,9% (2 gf - 20 mN)        | <0,8% (1,7 gf - 17 mN)             | <0,7% (1,2 gf - 12 mN)             |
| Stylus (diamond)                           | 15 $\mu$ m (spherical)      | 7 $\times$ 18 $\mu$ m (elliptical) | 7 $\times$ 18 $\mu$ m (elliptical) |
| Stylus mass                                | 0,2 mg                      | 0,2 mg                             | 0,1 mg                             |
| Stylus force                               | 1,5 ... 3 gf (15 ... 30 mN) | 1,5 ... 2,5 gf (15 ... 25 mN)      | 0,75 ... 1,5 gf (7,5 ... 15 mN)    |
| Recommended stylus force                   | 2 gf (20 mN)                | 1,7 gf (17 mN)                     | 1,2 gf (12 mN)                     |
| Dynamic compliance (lateral)               | >20 mm/N                    | >20 mm/N                           | >30 mm/N                           |
| Trackability                               | >90 $\mu$ m (2 gf - 20 mN)  | >90 $\mu$ m (1,7 gf - 17 mN)       | >80 $\mu$ m (1,2 gf - 12 mN)       |
| Codenummer of stylus unit                  | 4822 251 30048              | 4822 251 30049                     | 4822 251 30051                     |
| Bande passante                             | 20-20.000 Hz $\pm 2$ dB     | 20-20.000 Hz $\pm 2$ dB            | 20-25.000 Hz $\pm 2$ dB            |
| Sensibilité (1 kHz)                        | 1,3 mV/cm/sec               | 1,3 mV/cm/sec                      | 1,5 mV/cm/sec                      |
| Asymétrie des voies (1 kHz)                | <2 dB                       | <2 dB                              | <1 dB                              |
| Séparation des voies (1 kHz)               | >29 dB                      | >29 dB                             | >30 dB                             |
| Distorsion d'intermodulation               | <0,9% (2 gf - 20 mN)        | <0,8% (1,7 gf - 17 mN)             | <0,7% (1,2 gf - 12 mN)             |
| Dimensions de la pointe                    | 15 $\mu$ m (sphérique)      | 7 $\times$ 18 $\mu$ m (elliptique) | 7 $\times$ 18 $\mu$ m (elliptique) |
| Masse de la pointe de lecture              | 0,2 mg                      | 0,2 mg                             | 0,1 mg                             |
| Force d'appui                              | 1,5 ... 3 gf (15 ... 30 mN) | 1,5 ... 2,5 gf (15 ... 25 mN)      | 0,75 ... 1,5 gf (7,5 ... 15 mN)    |
| Force d'appui recommandée                  | 2 gf (20 mN)                | 1,7 gf (17 mN)                     | 1,2 gf (12 mN)                     |
| Elasticité (compliance) dynamique latérale | >20 mm/N                    | >20 mm/N                           | >30 mm/N                           |
| Aptitude à la lecture                      | >90 $\mu$ m (2 gf - 20 mN)  | >90 $\mu$ m (1,7 gf - 17 mN)       | >80 $\mu$ m (1,2 gf - 12 mN)       |
| Référence du bloc d'équipage mobile        | 4822 251 30048              | 4822 251 30049                     | 4822 251 30051                     |
| Risposta in frequenza                      | 20-20.000 Hz $\pm 2$ dB     | 20-20.000 Hz $\pm 2$ dB            | 20-25.000 Hz $\pm 2$ dB            |
| Sensibilità (1 kHz)                        | 1,3 mV/cm/sec               | 1,3 mV/cm/sec                      | 1,5 mV/cm/sec                      |
| Asimmetria in uscita (1 kHz)               | <2 dB                       | <2 dB                              | <1 dB                              |
| Separazione canali (1 kHz)                 | >29 dB                      | >29 dB                             | >30 dB                             |
| Distorsione FIM                            | <0,9% (2 gf - 20 mN)        | <0,8% (1,7 gf - 17 mN)             | <0,7% (1,2 gf - 12 mN)             |
| Puntina (diamante)                         | 15 $\mu$ m (conica)         | 7 $\times$ 18 $\mu$ m (ellittica)  | 7 $\times$ 18 $\mu$ m (ellittica)  |
| Massa puntina                              | 0,2 mg                      | 0,2 mg                             | 0,1 mg                             |
| Pressione d'appoggio                       | 1,5 ... 3 gf (15 ... 30 mN) | 1,5 ... 2,5 gf (15 ... 25 mN)      | 0,75 ... 1,5 gf (7,5 ... 15 mN)    |
| Pressione consigliata                      | 2 gf (20 mN)                | 1,7 gf (17 mN)                     | 1,2 gf (12 mN)                     |
| Cedevolezza dinamica (orizzontale)         | >20 mm/N                    | >20 mm/N                           | >30 mm/N                           |
| Tracciabilità                              | >90 $\mu$ m (2 gf - 20 mN)  | >90 $\mu$ m (1,7 gf - 17 mN)       | >80 $\mu$ m (1,2 gf - 12 mN)       |
| Codice puntina                             | 4822 251 30048              | 4822 251 30049                     | 4822 251 30051                     |
| Frequentiebereik                           | 20-20.000 Hz $\pm 2$ dB     | 20-20.000 Hz $\pm 2$ dB            | 20-25.000 Hz $\pm 2$ dB            |
| Gevoeligheid (1 kHz)                       | 1,3 mV/cm/sec               | 1,3 mV/cm/sec                      | 1,5 V/cm/sec                       |
| Kanaalasymmetrie (1 kHz)                   | <2 dB                       | <2 dB                              | <1 dB                              |
| Kanaalscheiding (1 kHz)                    | >29 dB                      | >29 dB                             | >30 dB                             |
| FIM-ervorming                              | <0,9% (2 gf - 20 mN)        | <0,8% (1,7 gf - 17 mN)             | <0,7% (1,2 gf - 12 mN)             |
| Naaldpunt (diamant)                        | 15 $\mu$ m (sferisch)       | 7 $\times$ 18 $\mu$ m (elliptisch) | 7 $\times$ 18 $\mu$ m (elliptisch) |
| Tipmassa                                   | 0,2 mg                      | 0,2 mg                             | 0,1 mg                             |
| Naaldkracht                                | 1,5 ... 3 gf (15 ... 30 mN) | 1,5 ... 2,5 gf (15 ... 25 mN)      | 0,75 ... 1,5 gf (7,5 ... 15 mN)    |
| Aanbevolen naaldkracht                     | 2 gf (20 mN)                | 1,7 gf (17 mN)                     | 1,2 gf (12 mN)                     |
| Dynamische compliantie (horiz.)            | >20 mm/N                    | >20 mm/N                           | >30 mm/N                           |
| Spooreigenschappen                         | >90 $\mu$ m (2 gf - 20 mN)  | >90 $\mu$ m (1,7 gf - 17 mN)       | >80 $\mu$ m (1,2 gf - 12 mN)       |
| Codenummer remplace-naald                  | 4822 251 30048              | 4822 251 30049                     | 4822 251 30051                     |



**SUPER M II GP 400 II - GP 401 II - GP 412 II**

|   | <b>GP 400 II</b>            | <b>GP 401 II</b>                   | <b>GP 412 II</b>                   |
|---|-----------------------------|------------------------------------|------------------------------------|
| Frekvensomfång                              | 20-20000 Hz $\pm 2$ dB      | 20-20000 Hz $\pm 2$ dB             | 20-25000 Hz $\pm 2$ dB             |
| Känslighet (1 kHz)                          | 1,3 mV/cm/sec               | 1,3 mV/cm/sec                      | 1,5 mV/cm/sec                      |
| Nivåskillnad mellan kanalerna (1 kHz)       | <2 dB                       | <2 dB                              | <1 dB                              |
| Kanalseparation (1 kHz)                     | >29 dB                      | >29 dB                             | >30 dB                             |
| FIM-distorsion (Frequency Intermodulation)  | <0,9% (2 gf - 20 mN)        | <0,8% (1,7 gf - 17 mN)             | <0,7% (1,2 gf - 12 mN)             |
| Nål (diamant)                               | 15 $\mu$ m (sfärisk)        | 7 $\times$ 18 $\mu$ m (elliptisk)  | 7 $\times$ 18 $\mu$ m (elliptisk)  |
| Nålmasa                                     | 0,2 mg                      | 0,2 mg                             | 0,1 mg                             |
| Nåltryck                                    | 1,5 ... 3 gf (15 ... 30 mN) | 1,5 ... 2,5 gf (15 ... 25 mN)      | 0,75 ... 1,5 gf (7,5 ... 15 mN)    |
| Rekommenderat nåltryck                      | 2 gf (20 mN)                | 1,7 gf (17 mN)                     | 1,2 gf (12 mN)                     |
| Fjädringsmjukhet                            | >20 mm/N                    | >20 mm/N                           | >30 mm/N                           |
| Följsamhet                                  | >90 $\mu$ m (2 gf - 20 mN)  | >90 $\mu$ m (1,7 gf - 17 mN)       | >80 $\mu$ m (1,2 gf - 12 mN)       |
| Nål - kodnummer                             | 4822 251 30048              | 4822 251 30049                     | 4822 251 30051                     |
|   |                             |                                    |                                    |
| Frekvensområde                              | 20-20.000 Hz $\pm 2$ dB     | 20-20.000 Hz $\pm 2$ dB            | 20-25.000 Hz $\pm 2$ dB            |
| Følsomhet (1 kHz)                           | 1,3 mV/cm/sec               | 1,3 mV/cm/sec                      | 1,5 mV/cm/sec                      |
| Utgangsasymmetri (1 kHz)                    | <2 dB                       | <2 dB                              | <1 dB                              |
| Kanalseparasjon (1 kHz)                     | >29 dB                      | >29 dB                             | >30 dB                             |
| FIM forvrengning                            | <0,9% (2 gf - 20 mN)        | <0,8% (1,7 gf - 17 mN)             | <0,7% (1,2 gf - 12 mN)             |
| Stift (diamant)                             | 15 $\mu$ m (rund)           | 7 $\times$ 18 $\mu$ m (elliptisk)  | 7 $\times$ 18 $\mu$ m (elliptisk)  |
| Stiftmasse                                  | 0,2 mg                      | 0,2 mg                             | 0,1 mg                             |
| Stifttrykk                                  | 1,5 ... 3 gf (15 ... 30 mN) | 1,5 ... 2,5 gf (15 ... 25 mN)      | 0,75 ... 1,5 gf (7,5 ... 15 mN)    |
| Anbefalt stifttrykk                         | 2 gf (20 mN)                | 1,7 gf (17 mN)                     | 1,2 gf (12 mN)                     |
| Dynamisk bevegelighet (horisontal)          | >20 mm/N                    | >20 mm/N                           | >30 mm/N                           |
| Springsevne                                 | >90 $\mu$ m (2 gf - 20 mN)  | >90 $\mu$ m (1,7 gf - 17 mN)       | >80 $\mu$ m (1,2 gf - 12 mN)       |
| Kodnummer på stift enhet                    | 4822 251 30048              | 4822 251 30049                     | 4822 251 30051                     |
|   |                             |                                    |                                    |
| Frekvensområde                              | 20-20.000 Hz $\pm 2$ dB     | 20-20.000 Hz $\pm 2$ dB            | 20-25.000 Hz $\pm 2$ dB            |
| Følsomhed (1 kHz)                           | 1,3 mV/cm/sec               | 1,3 mV/cm/sec                      | 1,5 mV/cm/sec                      |
| Symetri (1 kHz)                             | <2 dB                       | <2 dB                              | <1 dB                              |
| Kanaladskillelse (1 kHz)                    | >29 dB                      | >29 dB                             | >30 dB                             |
| Forvrængning (FIM)                          | <0,9% (20 mN - 2 gf)        | <0,8% (17 mN - 1,7 gf)             | <0,7% (12 mN - 1,2 gf)             |
| Nål (diamant)                               | 15 $\mu$ m (sfærisk)        | 7 $\times$ 18 $\mu$ m (elliptisk)  | 7 $\times$ 18 $\mu$ m (elliptisk)  |
| Nålemasse                                   | 0,2 mg                      | 0,2 mg                             | 0,1 mg                             |
| Nåletryk                                    | 15 ... 30 mN (1,5 ... 3 gf) | 15 ... 25 mN (1,5 ... 2,5 gf)      | 7,5 ... 15 mN (0,75 ... 1,5 gf)    |
| Anbefalet nåletryk                          | 20 mN (2 gf)                | 17 mN (1,7 gf)                     | 12 mN (1,2 gf)                     |
| Dynamisk compliance (horisontal)            | >20 mm/N                    | >20 mm/N                           | >30 mm/N                           |
| Trackability                                | >90 $\mu$ m (20 mN - 2 gf)  | >90 $\mu$ m (17 mN - 1,7 gf)       | >80 $\mu$ m (12 mN - 1,2 gf)       |
| Kodnummer på nåleenhed                      | 4822 251 30048              | 4822 251 30049                     | 4822 251 30051                     |
|   |                             |                                    |                                    |
| Toistoalue                                  | 20-20.000 Hz $\pm 2$ dB     | 20-20.000 Hz $\pm 2$ dB            | 20-25.000 Hz $\pm 2$ dB            |
| Herkkyyks (1 kHz)                           | 1,3 mV/cm/sec               | 1,3 mV/cm/sec                      | 1,5 mV/cm/sec                      |
| Kanavatasapaino (1 kHz)                     | <2 dB                       | <2 dB                              | <1 dB                              |
| Kanavaerotus (1 kHz)                        | >29 dB                      | >29 dB                             | >30 dB                             |
| Keskeismodulaatioisäro                      | <0,9% (20 mN - 2 p)         | <0,8% (17 mN - 1,7 p)              | <0,7% (12 mN - 1,2 p)              |
| Neula (timantti)                            | 15 $\mu$ m (pyöreä)         | 7 $\times$ 18 $\mu$ m (elliptinen) | 7 $\times$ 18 $\mu$ m (elliptinen) |
| Tehollinen neularassa                       | 0,2 mg                      | 0,2 mg                             | 0,1 mg                             |
| Neularasko                                  | 15 ... 30 mN (1,5 ... 3 p)  | 15 ... 25 mN (1,5 ... 2,5 p)       | 7,5 ... 15 mN (0,75 ... 1,5 p)     |
| Suosittelava neularasko                     | 20 mN (2 p)                 | 17 mN (1,7 p)                      | 12 mN (1,2 p)                      |
| Joustavuus (vaakatasossa)                   | >20 mm/N                    | >20 mm/N                           | >30 mm/N                           |
| Seurantakyky                                | >90 $\mu$ m (20 mN - 2 p)   | >90 $\mu$ m (17 mN - 1,7 p)        | >80 $\mu$ m (12 mN - 1,2 p)        |
| Tilaukkoodi                                 | 4822 251 30048              | 4822 251 30049                     | 4822 251 30051                     |
|   |                             |                                    |                                    |
| Respuesta de frecuencia                     | 20-20.000 Hz $\pm 2$ dB     | 20-20.000 Hz $\pm 2$ dB            | 20-25.000 Hz $\pm 2$ dB            |
| Sensibilidad (1 kHz)                        | 1,3 mV/cm/sec               | 1,3 mV/cm/sec                      | 1,5 mV/cm/sec                      |
| Asimetría de salida (1 kHz)                 | <2 dB                       | <2 dB                              | <1 dB                              |
| Separación de canales (1 kHz)               | >29 dB                      | >29 dB                             | >30 dB                             |
| Distorsión de intermodulación de frecuencia | <0,9% (2 gf - 20 mN)        | <0,8% (1,7 gf - 17 mN)             | <0,7% (1,2 gf - 12 mN)             |
| Aguja (diamante)                            | 15 $\mu$ m (esférica)       | 7 $\times$ 18 $\mu$ m (elíptica)   | 7 $\times$ 18 $\mu$ m (elíptica)   |
| Masa de la aguja                            | 0,2 mg                      | 0,2 mg                             | 0,1 mg                             |
| Presión de la aguja                         | 1,5 ... 3 gf (15 ... 30 mN) | 1,5 ... 2,5 gf (15 ... 25 mN)      | 0,75 ... 1,5 gf (7,5 ... 15 mN)    |
| Presión de la aguja aconsejada              | 2 gf (20 mN)                | 1,7 gf (17 mN)                     | 1,2 gf (12 mN)                     |
| Elasticidad dinámica (horizontal)           | >20 mm/N                    | >20 mm/N                           | >30 mm/N                           |
| Seguimiento del surco                       | >90 $\mu$ m (2 gf - 20 mN)  | >90 $\mu$ m (1,7 gf - 17 mN)       | >80 $\mu$ m (1,2 gf - 12 mN)       |
| Número de código de la unidad de aguja      | 4822 251 30048              | 4822 251 30049                     | 4822 251 30051                     |